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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/657,386	09/08/2000	Toshiaki Yoshihara	1100.64726	3309
24978	7590	05/03/2004	EXAMINER	
GREER, BURNS & CRAIN 300 S WACKER DR 25TH FLOOR CHICAGO, IL 60606			AKKAPEDDI, PRASAD R	
			ART UNIT	PAPER NUMBER
			2871	

DATE MAILED: 05/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/657,386

Applicant(s)

YOSHIHARA ET AL.

Examiner

Prasad R Akkapeddi

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 February 2004.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3-5,7-9,11-13,15 and 16 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1,3-5,7-9,11-13,15 and 16 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 08 September 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date 04/12/2004.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

2. The Examiner thanks Mr. Josh C. Snider for the courtesy extended during the telephone conversations and for the stimulating discussions on dielectric constant and spontaneous polarization aspects.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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a. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The new matter constitutes "*the relative dielectric constant being not affected by the spontaneous polarization*". It is generally accepted principles of physics (as also evidenced in the teachings of the prior art by Nishi col. 17, line 5 or equation 3) that the relative dielectric constant ( $\epsilon/\epsilon_{\text{sub } 0}$ ) of a material is a function of spontaneous polarization. Hence the recited limitation of '**not affected**' should be clearly explained or an evidentiary support be presented as to why the relative dielectric constant is not affected by the spontaneous polarization.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1,5,9 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Nishi et al. (Nishi) (U.S. Patent No. 5,541,747).

As to claim 1: Nishi discloses a liquid crystal display (Fig. 14) having a pair of substrates (11 and 12), liquid crystal element (17) with spontaneous polarization, a pixel electrode (13), a switching element (TFT) for driving the

liquid crystal. Nishi discloses that an amount of charge per unit area supplied is twice the product of spontaneous polarization of the liquid crystal material and the pixel area. In practice, it is necessary that the electric charge is 1 to 5 times is supplied (col. 9, lines 3-15). Hence the disclosure, when rewritten by mathematically reversing reads: the spontaneous polarization of the liquid crystal is a magnitude of either equal to or less than (i.e., not more than)  $\frac{1}{2}$  of a quantity of charge injected into a liquid crystal element corresponding to a pixel. The amount of charge depends on the driving voltage. Nishi also discloses the behavior of spontaneous polarization when a certain voltage is exceeded (i.e., a maximum driving voltage) (col. 12, lines 16-20). Hence the teachings of Nishi read on the recited limitation in the instant claim 1.

As to the newly recited limitation in claim 1: Nishi also discloses the relationship between the dielectric constant and the spontaneous polarization (col. 17, lines 3-10 and equation 3) and teaches that the dielectric constant varies with the spontaneous polarization and for a spontaneous polarization value of 12, the dielectric constant ( $\epsilon$ ) of the liquid crystal material is 106 pF/m. The relative dielectric constant is ( $\epsilon/\epsilon_0$ ) equals  $(106/8.854 = 11.97)$  which reads on the instant claims of the dielectric constant being not less than 3. Nishi also discloses only a component of the dielectric constant ( $\epsilon_{\text{sub } r}$ ) not being dependent on spontaneous polarization. However, the relative dielectric constant defined as ( $\epsilon/\epsilon_{\text{sub } o}$ ) does depend on the spontaneous polarization as can be seen from equation 3 of Nishi.

As to claims 5, 9 and 13: Nishi discloses spontaneous polarization values of less than 10 nC/cm<sup>2</sup> preferably less than 8 nC/cm<sup>2</sup> (col. 13, lines 33-39), which read on the instant claims of not more than 7, 10 and 15 nC/cm<sup>2</sup>.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3-4, 7-8, 11-12 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi in view of Ishii et al. (Ishii) (U.S. Patent No. 5,642,214).

As to claims 3-4, 7-8, 11-12 and 15-16: Nishi does not disclose the use of color filters of three primary colors or the use of three separate light sources emitting light rays of three primary colors and switching.

However, Ishii in disclosing an optical modulating element consisting of ferroelectric liquid crystal, discloses a lamp source (36) the use of three filters (red, green and blue) (col.3, line 2) and light sources for the three primary colors and switching them sequentially, (Col 3, line 67) and (Col 4, lines 1 and 17-27).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the separate light sources disclosed by Ishii to the display device disclosed by Nishi for an alternate way of obtaining light sources having the three primary colors and such a use of separate light sources will result in an increase in resolution for these devices

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(col. 4, line 1) and also for enabling miniaturization of construction and improvement of indication quality (col. 4, lines 30-35).

***Response to Arguments***

8. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prasad R Akkapeddi whose telephone number is 571-272-2285. The examiner can normally be reached on 7:00AM to 5:30PM M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on 571-272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Prasad R Akkapeddi, Ph.D  
Examiner  
Art Unit 2871

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